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Japanese Kokai Patent Application
No. Hei 4[1992]-253690

HOLDING STAND FOR TRANSPORTATION OF CONTAINERS

Akihiko Koga et al.

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HOLDING STAND FOR TRANSPORTATION OF CONTAINERS

[Yokirui no hansoyo sueokidai]

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[There are no amendments to this patent.]

Claim

A type of holding stand for transportation of containers characterized by the following facts: the holding stand for transportation of containers is used in supporting containers of different types and in different shapes and transporting them to filling, capping, and other steps of operation; in the recession of the main body of the holding stand having a unified outer shape, a container supporting member made of a shape-memory resin that changes its shape as the temperature varies is set.

Detailed explanation of the invention

[0001]

Industrial application field

This invention pertains to a type of holding stand for transportation of containers. Said holding stand supports containers in different shapes and of different types, such as containers for foods, detergents, makeup, etc., and transports them to the filling, capping, and other steps of operation.

[0002]

Prior art

Figure 5 is a diagram illustrating a conventional rotary filling machine. (1) represents drink cans or other containers; (2) represents the conveyer main body for transporting said containers (1) to the filling, capping, and other steps of operation; (3) represents a guide member set in the transporting direction of said conveyer main body (2); (4) represents the chain of said conveyer main body (2); (5) represents a star wheel set in the middle of said conveyer main body (2); (6) represents a feed screw set in the middle of said conveyer main body (2); (7) represents a rotary filling machine; (8) represents a capping machine of said rotary filling machine; and (9) represents an outlet conveyer set on the downstream side in the transporting direction of said capping machine (8).

[0003]

For the above rotary filling machine shown in Figure 5, empty containers (1) are guided by guide member (3) and are transported towards star wheel (5) and feed screw (6) by means of chain (4) of conveyer main body (2). By means of said star wheel (5) and feed screw (6), containers (1) are set with a uniform interval between them, and they are sent to rotary filling machine (7), where containers (1) are filled with a drink or the like. Then, the containers are sent to capping machine (8) for capping, and they are then exhausted by means of outlet conveyer (9).

[0004]

Figure 6 is an enlarged oblique view of the periphery of said conveyer main body (2). Since containers (1) for filling with drinks, etc. have different sizes, it is hard to handle them using the same system of machines (conveyer, filling machine, and capping machine). Even when such operation can be performed, one has to exchange the setting and members of the various portions of the machines. The so-called mold-exchange time becomes longer, and it requires significant man-hours. This is a problem.

[0005]

As shown in Figure 6, in the manufacturing process of containers with different sizes and types, each of small quantity, containers (1) have their lower portions sitting in holding stands (10) made of nylon, polyethylene, or another synthetic resin for transportation. For each said holding stand (10) for transportation, the recession is formed in a cylindrical shape fitting the outer shape of said container (1). On the other hand, the outer shape of holding stand (10) itself is formed to be uniform for all of them, with the largest dimension for handling containers (1) of the different types.

[0006]

For example, for cylindrical containers (11) and (12) with different sizes shown in Figures 7 and 8, two types of holding stands (13) and (14) with different inner dimensions for their recessions to fit said containers are prepared. These two types of holding stands (13), (14) for transportation have the same outer diameter and the same height. Also, as shown in Figures 9 and 10, for containers (15) and (16) in different shapes with directionality, two types of holding stands (17) and (18) having their recessions formed in elliptical shape and rounded square shape, respectively, are formed to fit said containers.

[0007]

For the aforementioned holding stands for transportation (hakama [transliteration]), when the outer shape is the same for all of the containers, there is no need to correct the setting of the machines (such as spacing between guide members (3) of conveyer main body (2), pitch of star wheel (5) and feed screw (6)).

[0008]

Problems to be solved by the invention

(1) For said rotary filling machine (7), although the filling efficiency is high and it is thus widely adopted, if the container type is changed frequently, instead of rotary filling machine (7) being used as a dedicated machine for a single type of container, it is necessary to prepare holding stands (13), (14), (17), (18) for transportation dedicated to the various types of containers, respectively. As a result, the cost rises, and mold exchange requires many man-hour, since all of the holding stands have to be exchanged.

[0009]

Also, since the number of holding stands for transportation is in the hundreds or even thousands for each type of container, the cost is high, and they occupy a large amount of

warehouse space. This also boosts the cost. (2) For said problem (1), the following scheme has been proposed: as shown in Figure 11, paraffin or another wax material (20) is melted and is allowed to flow into holding stand main body (19). After container molding (male molding) (15) is inserted and while at a high temperature (in a fluid state), the wax material is cooled and solidified. As a result, female mold (21) is formed as the interior of holding stand main body (19). In this way, a holding stand is formed. (For example, see: Japanese Utility Model Application No. Hei 2[1990]-120732).

[0010]

For said holding stand for transportation, processing occurs in company with a phase change from solid to liquid, so wax material (20) in fluid state is handled when the female mold is formed. Consequently, the operation should be carried out carefully. Also, latent heat is involved in the melting/solidification, so a large amount of heat for heating/cooling is needed, and the time for heating/cooling is long. The objective of this invention is to solve the aforementioned problems of the prior art by providing a type of holding stand for transportation of containers characterized by the fact that for a container supporting member made of a shape-memory resin, operation is performed in a sequence of heating → deformation of the supporting member corresponding to the container → cooling → fixing of the deformed shape. As a result, the holding stand for transportation of containers can transport containers of different types and in different shapes. That is, the holding stand for transportation has universal applicability. Also, the holding stand for transportation of containers of this invention can reduce the noise level generated when collecting the holding stands together as well as their vibration.

[0011]

Means to solve the problem

In order to realize the aforementioned objective, this invention provides a type of holding stand for transportation of containers characterized by the following facts: the holding stand for transportation of containers is used to support containers of different types and in different shapes and to transport them to filling, capping, and other steps of operation; in the recession of the main body of the holding stand which has a universal outer shape, a container supporting member made of a shape-memory resin that changes its shape as the temperature varies is set.

[0012]

Operation

For the holding stand for transportation of containers in this invention with the aforementioned constitution, the entirety of the holding stand for transportation with said

supporting member made of a shape-memory resin contained in it is dipped in warm water or is set in a warm air flow so that the resin is softened. Then, the container is inserted in the open portion formed in the supporting member for containers, so that the open portion is pressed wider. Then, the entire holding stand for transportation is set to cool down. As a result, the supporting member for containers has its deformed shape fixed, and it can be used in transporting containers of the same shape and dimensions as that used in preparing the shape. When containers of a different shape are to be transported, the same operation as aforementioned is performed in treating the supporting member for containers, that is, heating → deformation → fixing of deformed shape.

[0013]

Application examples

In the following, the holding stand for transportation of containers of this invention will be explained with reference to Application Example 1 shown in Figure 1. (15) represents a container of one of various shapes and types; (100) represents a holding stand for transportation; (101) represents the main body (outer case) of the holding stand. Said holding stand main body (101) is made of nylon or another synthetic resin.

[0014]

(102) represents an inner member. Said inner member (102) is composed of container supporting members (plates) (103), (104) made of a shape-memory resin, and spacer (105) for fixing said supporting members (103), (104) on the inner surface of holding stand main body (101). In the central portion of said container supporting members (103), (104), cut hole (17) is formed in a size a little smaller than horizontal cross-sectional shape (106) of container (15) (this horizontal cross-sectional shape (106) varies in the height direction of container (15). The shape corresponding to the height corresponding approximately to the lower half portion of container (15) is taken as the object). As a simple scheme, said cut hole (17) may have a shape similar to horizontal cross-sectional shape (106) (elliptical shape) of container (15). However, as shown in Figure 1, the edge portion of cut hole (17) is formed in chrysanthemum shape so as to facilitate deformation of said container supporting members (103), (104) when container (15) is inserted into cut hole (17). In this case, container (15) is not in contact with said container supporting members (103), (104) over the entire circumference of container (15). Instead, partial contact occurs by means of hooks (108) (there are six of them in the example shown in Figure 1)).

[0015]

In the following, the operation of the holding stand for transportation of containers shown in Figure 1 will be explained more specifically. Container supporting members (plates) (103), (104) as inner members of holding stand main body (101) are made of a shape-memory resin. As shown in Figure 2, for a shape-memory resin, when the temperature rises over a prescribed level, it softens drastically (without melting), and its longitudinal modulus E that represents the easiness of deformation decreases significantly. The transition point Tg is called the glass transition point. The value of glass transition point Tg can be adjusted significantly by changing the composition of the resin raw material. Consequently, it is easy to set transition point Tg higher than room temperature but not extremely high, say, at about 60°C.

(1) The entirety of holding stand (100) for transportation and containing container supporting members (103), (104) made of a shape-memory resin and treated as aforementioned is dipped in warm water or is exposed to warm air flow so that its temperature is increased to 60°C or higher. As a result, container supporting members (103), (104) made of shape-memory resin are softened.

(2) Then, container (15) or a molding in the shape of container (15) (it may be only the lower half portion of container (15)) is inserted from above holding stand (100) for transportation into cut hole (107) of container supporting members (103), (104) made of shape-memory resin, and the bottom of container (15) contacts the bottom of holding stand main body (101). In this case, hooks (108) are pressed wider by the outer peripheral surface of container (15).

(3) Then, the entirety of holding stand (100) for transportation is set to cool down to room temperature (such as 20°C) so that hooks (108) are fixed in the deformed state. Also, one may dip the holding stand in water for cooling so that hooks (108) can be fixed quicker.

(4) After that, holding stand (100) for transportation can be used as a holding stand for transportation dedicated to said container (15).

(5) When said holding stand (100) of transportation is to be used as a holding stand for transportation of container (15) in another different shape, the operations of step (1) and thereafter are repeated to deform and fix hooks (108).

(6) The aforementioned shape-memory resin has another attractive feature. That is, as shown in Figure 2, at a temperature near the glass transition point, the internal loss coefficient (usually represented as tan δ) of the material depicts a curve, and the internal loss coefficient is much higher than that of a conventional resin. For a material with a high internal loss coefficient, when an impact or vibration is applied from the outside, the impact or vibration can be damped. That is, the material has a high damping property. As a result, it can reduce the noises generated by collision between holding stand main bodies (101) and their vibration.

[0016]

In the following, Application Example 2 of the holding stand for transportation of containers in this invention will be explained with reference to Figure 3. (15) represents a container of one of various shapes and types (hakama); (110) represents the holding stand for transportation; and (111) represents the main body (outer case) of the holding stand. This holding stand main body (111) is made of nylon or another synthetic resin. (112) is an inner member. Said inner member (112) is composed of container supporting members (plates) (113), (113) and (114), (114) made of a shape-memory resin. The two end portions of said container supporting members (113), (114) are inserted in plural longitudinal slots (115) formed through the inner surface of holding stand main body (111), and they are fixed in grid shape inside holding stand main body (111). Also, in the structure shown in Figure 3, said container supporting members are assembled as two stages. However, one may also have three or more stages.

[0017]

In the central portion of said container supporting members (113), (114), a space portion is formed a little smaller than horizontal cross-sectional shape (106) of container (15) (this horizontal cross-sectional shape (106) depends on the position in the height direction of container (15), and the shape corresponding to approximately the lower half portion of container (15) is taken as the object). In the following, the operation of the holding stand for transportation of containers shown in Figure 3 will be explained in more detail.

(1) Just as the holding stand for transportation in Application Example 1, the entirety of holding stand (110) for transportation is heated, and container (15) is inserted into the space portion at the center of container supporting members (113), (114) made of a shape-memory resin. As container supporting members (113), (114) are softened, they are pressed wider and are bent, so that the outer peripheral surface of container (15) contacts container supporting members (113), (114).

(2) Then, the entirety of holding stand (100) [sic; (110)] for transportation is set to cool down to room temperature (such as 20°C) so that container supporting members (113), (114) made of a shape-memory resin are fixed in the deformed state.

[0018]

In the following, Application Example 3 of the holding stand for transportation of containers in this invention will be explained with reference to Figure 4. (15) represents one of containers of different shapes and of different types (hakama); (120) represents the holding stand for transportation; and (121) represents the main body (outer case) of the holding stand. This holding stand main body (121) is made of nylon or another synthetic resin. (122) represents a

container supporting member made of a shape-memory resin and formed by means of foam molding. Said container supporting member (122) made of a shape-memory resin is filled in said holding stand main body (outer case) (121).

[0019]

At the center of said container supporting member (122) made of a shape-memory resin, hole (123) is formed beforehand in a size a little smaller than that of the horizontal cross-sectional shape of container (15). On the interior peripheral surface of said hole (123), bumps and dips (124) are formed, with bumps in contact with the outer peripheral surface of container (15). In the following, the operation of the holding stand for transportation of containers shown in Figure 4 will be explained in more detail.

(1) Just as the holding stands for transportation in Application Examples 1 and 2, the entirety of holding stand (120) for transportation is heated, and container (15) is inserted into hole (123) of container supporting member (122) made of a shape-memory resin. As container supporting member (122) is softened, it is pressed wider and is bent, so that the outer peripheral surface of container (15) contacts the bumps of hole (123) of said container supporting member (122).

(2) Then, the entirety of holding stand (120) for transportation is set to cool down to room temperature (such as 20°C) so that container supporting member (122) made of a shape-memory resin is fixed in the deformed state.

[0020]

Effect of the invention

For the holding stand for transportation of containers in this invention, as explained above, for the container supporting member made of a shape-memory resin and within said holding stand, the following steps of operation are performed: heating → deformation of the supporting member corresponding to the container → cooling → fixing of the deformed shape. As a result, the holding stand for transportation of containers can transport containers of different types and in different shapes. That is, the holding stand for transportation has universal applicability.

[0021]

Also, since the aforementioned shape-memory resin exhibits a significant internal loss coefficient rise near the glass transition point, the holding stand for transportation of containers of this invention has a damping effect higher than that of a conventional resin (nylon, etc.) near the temperature for use of the holding stand for transportation. As a result, it can reduce the noise

level generated when collecting holding stands together as well as their vibration. Consequently, it can improve the working environment and it can meet future demands for further increases in operation speed.

Brief description of the figures

Figure 1 is an oblique view illustrating Application Example 1 of the holding stand for transportation of containers in this invention.

Figure 2 is a diagram illustrating the viscoelastic characteristics of a shape-memory resin versus temperature.

Figure 3 is an oblique view illustrating Application Example 2 of the holding stand for transportation of containers in this invention.

Figure 4 is an oblique view illustrating Application Example 3 of the holding stand for transportation of containers in this invention.

Figure 5 is an oblique view illustrating a conventional rotary filling machine.

Figure 6 is an enlarged oblique view illustrating the conveyer portion of said rotary filling machine.

Figure 7 is an oblique view illustrating a conventional holding stand for transportation.

Figure 8 is an oblique view illustrating another example of the prior art of a holding stand for transportation having a size of the recession different from that shown in Figure 7.

Figure 9 is an oblique view illustrating another example of the prior art of a holding stand for transportation having a shape of the recession different from that shown in Figures 7 and 8.

Figure 10 is an oblique view illustrating another example of the prior art of a holding stand for transportation having a shape of the recession different from that shown in Figures 7-9.

Figure 11 is an oblique view illustrating a holding stand for transportation proposed at one time by the present patent applicant.

Explanation of part numbers

15 Container
100 Holding stand for transportation of containers
101 Holding stand main body
103 Container supporting member made of a shape-memory resin
104 Container supporting member made of a shape-memory resin
110 Holding stand for transportation of containers
111 Holding stand main body
113 Container supporting member made of a shape-memory resin
114 Container supporting member made of shape-memory resin

120 Holding stand for transportation of containers
121 Holding stand main body
122 Container supporting member made of a shape-memory resin

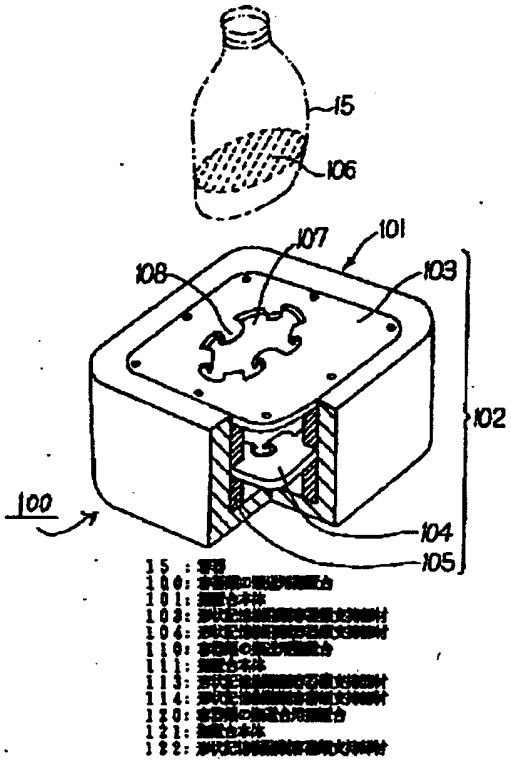

Figure 1

Legend:

15 Container
100 Holding stand for transportation of containers
101 Holding stand main body
103 Container supporting member made of a shape-memory resin
104 Container supporting member made of a shape-memory resin
110 Holding stand for transportation of containers
111 Holding stand main body
113 Container supporting member made of a shape-memory resin
114 Container supporting member made of a shape-memory resin
120 Holding stand for transportation of containers
121 Holding stand main body
122 Container supporting member made of a shape-memory resin

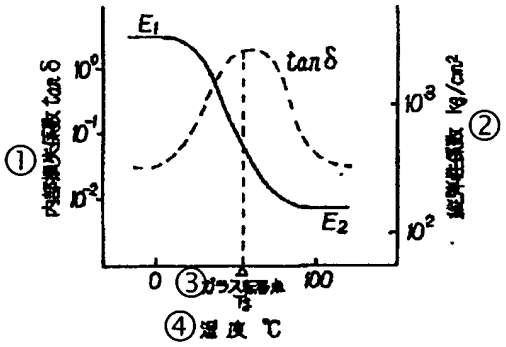

Figure 2

Key: 1 Internal loss coefficient tan δ
2 Longitudinal modulus Kg/cm^2
3 Glass transition point Tg
4 Temperature °C

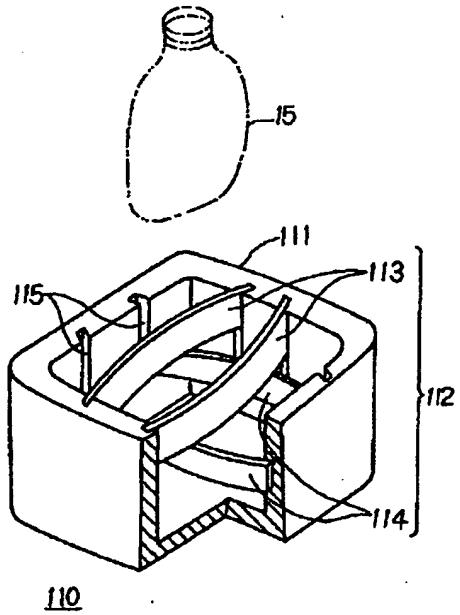

Figure 3

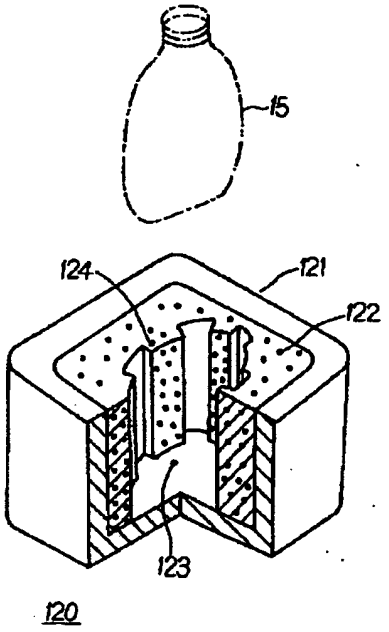

Figure 4

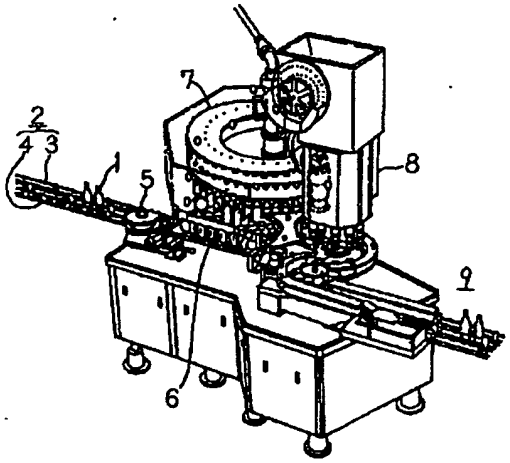

Figure 5

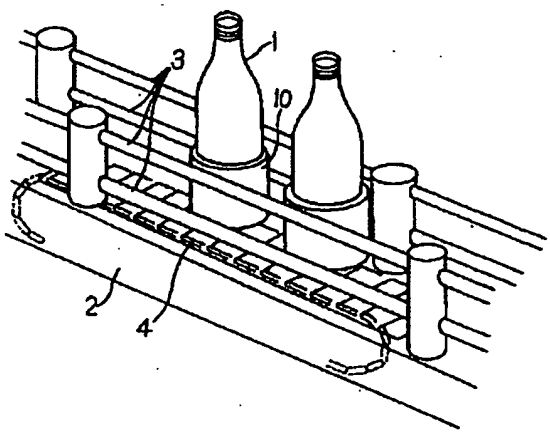

Figure 6

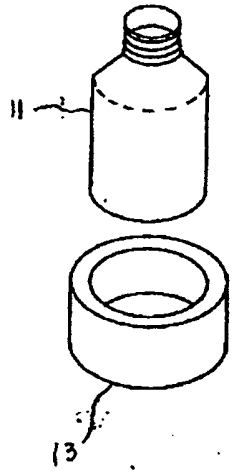

Figure 7

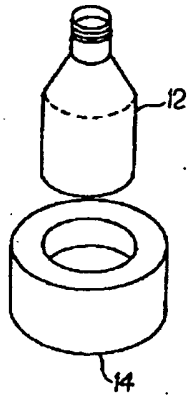

Figure 8

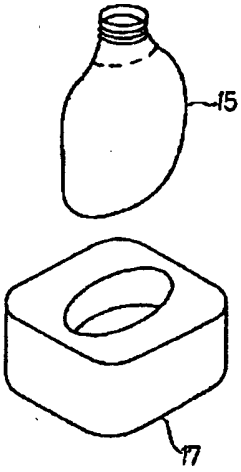

Figure 9

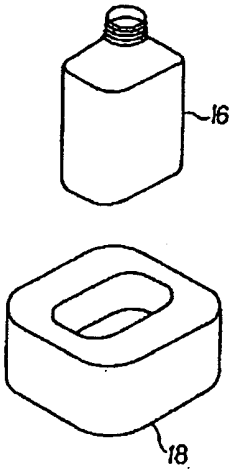

Figure 10

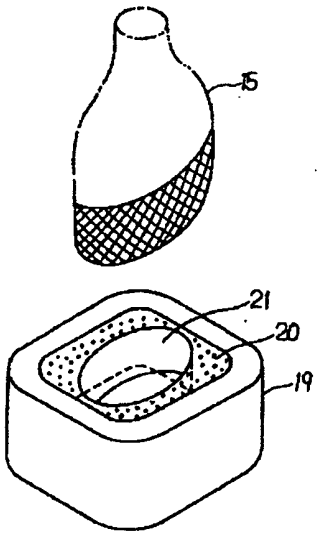

Figure 11

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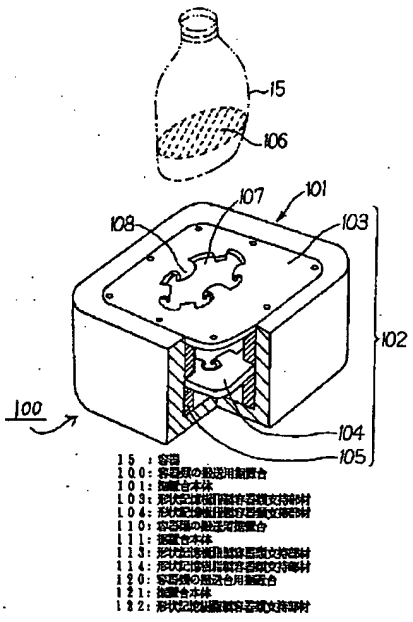
(54)【発明の名称】　容器類の搬送用据置台

(57)【要約】

【目的】　形状記憶合金製容器類支持部材に対する昇温→同支持部材の容器類に対応した変形→冷却→変形固定の操作により，異種異形の容器類を搬送して，搬送用据置台自身に汎用性を付与する。また据置台本体同士の衝突，振動に伴って発生する騒音を低減する。

【構成】　形状記憶樹脂製容器類支持部材１０３，１０４を内蔵した搬送用据置台１００の全体を温湯に漬けるか，温風にさらして，軟化させ，次いで容器１５を同容器類支持部材に形成した空間部１０７内へ挿入して，同空間部１０７（爪１０８）を押し広げ，次いで搬送用据置台１００の全体を放冷し，同容器類支持部材を変形状態のまま固定して，同じ形状，寸法の容器の搬送に使用する。また上記容器とは異種異形の容器類を搬送する場合には，同じ要領で上記容器類支持部材を昇温→変形→固定する。



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【特許請求の範囲】

【請求項1】　異種異形の容器類を支持して，充填，密栓等の工程に搬送する容器類の搬送用据置台において，統一された外部形状を有する据置台本体の凹陥部内に，温度変化により形状の変化する形状記憶樹脂製容器類支持部材を設けたことを特徴とする容器類の搬送用据置台。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は，食品，洗剤，化粧品等の異形異種の容器類を支持して，充填，密栓等の工程に搬送する容器類の搬送用据置台に関するものである。

【０００２】

【従来の技術】従来のロータリー充填機を図５により説明すると，１が例えば飲料壜等の容器，２が同容器１を充填，密栓等の工程に搬送するコンベア本体，３が同コンベア本体２の搬送方向に配設したガイド部材，４が同コンベア本体２のチエーン，５がコンベア本体２の途中に配設したスターホイール，６が同コンベア本体２の途中に配設したフイードスクリユー，７がロータリー充填機，８が同ロータリー充填機７の打栓機，９が同打栓機８の搬送方向下流側に配設した出口コンベアである。

【０００３】上記図５に示すロータリー充填機では，空き容器１をガイド部材３によりガイドしながらコンベア本体２のチエーン４によりスターホイール５及びフイードスクリユー６の方向へ搬送して，これらのスターホイール５及びフイードスクリユー６により容器１間の間隔を整えて，ロータリー充填機７へ送り込んで，飲料等を容器１内へ充填し，次いで打栓機８へ送り，打栓して，出口コンベア９により排出する。

【０００４】図６は，前記コンベア本体２の周辺を拡大した斜視図である。飲料等を充填する容器１には，様々なサイズがあり，これを同一の機械（コンベア，充填機，打栓機）によりハンドリングするのは困難である。仮に可能であるとしても，機械各部のセツテイングや部品の交換を必要として，所謂型替時間を長くする上に，多くの手間を要するという問題があった。

【０００５】そこで様々なサイズ，形状の容器１が流れる多品種少量生産工程では，図６に示すように容器１の下部にナイロン，ポリエチレン等の合成樹脂性搬送用据置台（ハカマ）１０をはかせて，搬送するようにしている。この搬送用据置台１０は，凹陥部を当該容器１の外形に合わせて円柱状に形成する一方，据置台１０自身の外形寸法を取り扱う複数種類の容器１の最大サイズをカバーするに足る統一された外形寸法に形成している。

【０００６】例えば図７，８は，凹陥部を大きさの異なる円形容器１１，１２に合わせて円柱状に形成する一方，凹陥部の内形寸法を異ならせた，２種類の２種類の搬送用据置台１３，１４を示している。そして搬送用据置台１３，１４の外径寸法と高さは同じである。また図

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９，１０は，方向性を持った異形容器１５，１６に合わせて，凹陥部の形状を楕円柱状及び丸みを帯びた四角柱状に形成した，２種類の搬送用据置台１７，１８を示している。

【０００７】以上の搬送用据置台（ハカマ）により，各種容器の見かけの外形を統一して，機械のセツテイング（例えばコンベア本体２のガイド部材３の間隔，スターホイール５及びフイードスクリユー６のピツチ修正）を不用にしている。

【０００８】

【発明が解決しようとする課題】（１）前記ロータリー充填機７は，充填効率がよくて，多用されているが，単一容器の専用機として使用する場合はともかく，頻繁に容器替え（型替え）を行うロータリー充填機７の場合には，各容器専用の搬送用据置台（ハカマ）１３，１４，１７，１８等を必要とし，これを多数製作しなければならなくて，費用が嵩む上に，型替え時には，これら全ての搬送用据置台を入替えなければならなくて，多くの手間を必要とする。

【０００９】また搬送用据置台（ハカマ）の個数は，容器一種類当たり数百個から数千個に達して，これを何種類も在庫しておくのは，経済的にも，スペース的にも，不経済である。（２）前記（１）の課題に対しては，図１１に示すように据置台本体１９の内部にパラフイン等のろう材２０を流し込んで，高温（流動状態）で容器型（雄型）１５を挿入した後，冷却，固化して，据置台本体１９の内部に雌型２１を形成する搬送用据置台（必要ならば実願昭平２－１２０７３２号明細書を参照されたい）を既に提案している。

【００１０】この搬送用据置台は，固体から液体への相変化を伴うプロセスを経るものであり，雌型形成時には，流動状態のろう材と２０を取り扱うため，操作に気を使う。また融解／固化に潜熱が介在するため，加熱・冷却熱量が大きくて，昇温・降温時間が長くなる傾向があった。本発明は前記の問題点に鑑み提案するものであり，その目的とする処は，形状記憶樹脂製容器類支持部材に対する昇温→同支持部材の容器類に対応した変形→冷却→変形固定の操作により，異種異形の容器類を搬送できて，搬送用据置台自身に汎用性を付与できる。また据置台本体同士の衝突，振動に伴って発生する騒音を低減できる容器類の搬送用据置台を提供しようとする点にある。

【００１１】

【課題を解決するための手段】上記の目的を達成するために，本発明は，異種異形の容器類を支持して，充填，密栓等の工程に搬送する容器類の搬送用据置台において，統一された外部形状を有する据置台本体の凹陥部内に，温度変化により形状の変化する形状記憶樹脂製容器類支持部材を設けている。

【００１２】

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【作用】本発明の容器類の搬送用据置台は前記のように構成されており，形状記憶樹脂製容器類支持部材を内蔵した搬送用据置台の全体を温湯に漬けるか，温風にさらして，軟化させ，次いで容器を同容器類支持部材に形成した空間部内へ挿入して，同空間部を押し広げ，次いで搬送用据置台の全体を放冷し，同容器類支持部材を変形状態のまま固定して，同じ形状，寸法の容器の搬送に使用する。また上記容器とは異種異形の容器類を搬送する場合には，同じ要領で上記容器類支持部材を昇温→変形→固定する。

【００１３】

【実施例】次に本発明の容器類の搬送用据置台を図１に示す第１実施例により説明すると，１５が異形異種の容器，１００が搬送用据置台（ハカマ），１０１が据置台本体（外ケース）で，同据置台本体１０１は，ナイロン等の合成樹脂材により構成されている。

【００１４】また１０２が内装材で，同内装材１０２は，形状記憶樹脂製容器類支持部材（プレート）１０３，１０４と，同各支持部材１０３，１０４を据置台本体１０１の内面に固定するスペーサ１０５とにより構成されている。そして上記容器類支持部材１０３，１０４の中央部には，容器１５の水平断面形状１０６（この水平断面形状１０６は，容器１５の高さ方向位置で変化するが，容器１５の略下半分に相当する位置での形状を対象にしている）よりも若干小さめの切欠穴１７が加工されている。この切欠穴１７の形状は，簡単には容器１５の水平断面形状１０６に相似の形状（楕円形）でもよいが，図１では，切欠穴１７の縁部を菊型にして，容器１５を切欠穴１７に挿入する際に上記容器類支持部材１０３，１０４を変形し易くしている。このとき，容器１５と上記容器類支持部材１０３，１０４との接触は，容器１５全周ではなく，爪１０８（図１では６個所）による部分接触になる。

【００１５】次に前記図１に示す容器類の搬送用据置台の作用を具体的に説明する。据置台本体１０１の内装材である容器類支持部材（プレート）１０３，１０４は，形状記憶樹脂製である。形状記憶樹脂は，図２に示すように或る温度を越えると，急激に軟化し（溶融ではない），変形し易さを表す縦弾性係数Ｅが大幅に低下する。この遷移温度Ｔｇをガラス転移点と呼ぶが，遷移温度Ｔｇの値は，樹脂原料の配合により，相当の幅で調節可能である。従って常温よりは高いが，余り高くない温度，例えば６０℃付近に遷移温度Ｔｇを設定するのは容易である。

（１）上記のように調整した形状記憶樹脂製容器類支持部材１０３，１０４を内蔵した搬送用据置台１００の全体を温湯に漬けるか，温風にさらして，例えば６０℃以上に昇温させて，形状記憶樹脂製容器類支持部材１０３，１０４を軟化させる。

（２）次いで容器１５または容器１５の形をした型（容器１５の略下半分でよい）を搬送用据置台１００の上から形状記憶樹脂製容器類支持部材１０３，１０４の切欠穴１０７へ挿入して，容器１５底部を据置台本体１０１の底部に当接させる。このとき，爪１０８が容器１５の外周面により押し広げられる。

（３）次いで搬送用据置台１００の全体を常温（例えば２０℃）まで放冷して，爪１０８を変形状態のまま固定する。なお水に漬けて，冷却すれば，爪１０８がより早く固定される。

（４）それから，この搬送用据置台１００は，当該容器１５に合わせた専用搬送用据置台として使用される。

（５）またこの搬送用据置台１００を別の異形異種容器１５の搬送用据置台として使用する場合には，（１）項からの操作を繰り返して，爪１０８を変形，固定させる。

（６）上記形状記憶樹脂には，もう１つの注目すべき特徴がある。即ち，図２において，ガラス転移点付近の温度で，材料の内部損失係数（一般にｔａｎδと表現される）がピークを描くことにより，一般の樹脂よりも大幅に大きい内部損失係数を示す。内部損失係数が大きい材料は，外部から衝撃乃至振動が加えられたとき，衝撃乃至振動を減衰する，所謂，高ダンピング材料としての性質を持ち，据置台本体１０１同士の衝突，振動に伴って発生する騒音を低減する。

【００１６】次に本発明の容器類の搬送用据置台を図３に示す第２実施例により説明すると，１５が異形異種の容器，１１０が搬送用据置台（ハカマ），１１１が据置台本体（外ケース）で，同据置台本体１１１は，ナイロン等の合成樹脂材により構成されている。また１１２が内装材で，同内装材１１２は，形状記憶樹脂製容器類支持部材（プレート）１１３，１１３，及び１１４，１１４により構成され，これら容器類支持部材１１３，１１４の両端部が据置台本体１１１の内面に穿設した複数の縦溝１１５に嵌挿されて，据置台本体１１１内に井桁状に固定されている。なお図３では，これら容器類支持部材を２段に組付けているが，３段以上でもよい。

【００１７】そして上記容器類支持部材１１３，１１４の中央部には，容器１５の水平断面形状１０６（この水平断面形状１０６は，容器１５の高さ方向位置で変化するが，容器１５の略下半分に相当する位置での形状を対象にしている）よりも若干小さめの空間部が形成されている。次に前記図３に示す容器類の搬送用据置台の作用を具体的に説明する。

（１）第１実施例の搬送用据置台と同様に，搬送用据置台１１０の全体を昇温させ，容器１５を井桁に組まれた形状記憶樹脂製容器類支持部材１１３，１１４の中央部の空間部内へ挿入して，軟化したこれら容器支持部材１１３，１１４を押し広げながら曲げて，容器１５の外周面をこれら容器支持部材１１３，１１４に接触させる。

（２）次いで搬送用据置台１００の全体を常温（例えば

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２０℃）まで放冷して，形状記憶樹脂製容器類支持部材１１３，１１４を変形状態のまま固定する。

【００１８】次に本発明の容器類の搬送用据置台を図４に示す第３実施例により説明すると，１５が異形異種の容器，１２０が搬送用据置台（ハカマ），１２１が据置台本体（外ケース）で，同据置台本体１２１は，ナイロン等の合成樹脂材により構成されている。また１２２が発泡成形して形成した形状記憶樹脂製容器類支持部材で，同形状記憶樹脂製容器類支持部材１２２が上記据置台本体（外ケース）１２１内に充填されている。

【００１９】そしてこの形状記憶樹脂製容器類支持部材１２２の中央部には，容器１５の水平断面形状よりも若干小さめの抜き穴１２３が予め加工されている。またこの抜き穴１２３の内周面には，凹凸状部１２４が形成されており，凸部が容器１５の外周面に部分接触することになる。次に前記図４に示す容器類の搬送用据置台の作用を具体的に説明する。

（１）第１，２実施例の搬送用据置台と同様に，搬送用据置台１２０の全体を昇温させ，容器１５を形状記憶樹脂製容器類支持部材１２２の抜き穴１２３へ挿入して，軟化した同容器支持部材１２２を押し広げながら曲げて，容器１５の外周面を同容器支持部材１２２の抜き穴１２３の凸部に接触させる。

（２）次いで搬送用据置台１２０の全体を常温（例えば２０℃）まで放冷して，形状記憶樹脂製容器類支持部材１２２を変形状態のまま固定する。

【００２０】

【発明の効果】本発明の容器類の搬送用据置台は前記のように据置台本体内の形状記憶合金製容器類支持部材に対する昇温→同支持部材の容器類に対応した変形→冷却→変形固定という操作により，異種異形の容器類を搬送できて，搬送用据置台に汎用性を付与できる。

【００２１】また上記形状記憶樹脂は内部損失係数がガラス転移温度付近で大幅に上昇するので，搬送用据置台の使用温度（常温）付近でも，通常の樹脂（ナイロン等）よりも大きなダンピング効果を得ることができ，据置台本体同士の衝突，振動に伴って発生する騒音を低減

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できて，労働環境の改善，将来の高速化等に対応できる効果がある。

【図面の簡単な説明】

【図１】本発明に係わる容器類の搬送用据置台の第１実施例を示す斜視図である。

【図２】形状記憶樹脂の温度による粘弾性特性を示す説明図である。

【図３】本発明に係わる容器類の搬送用据置台の第２実施例を示す斜視図である。

【図４】本発明に係わる容器類の搬送用据置台の第３実施例を示す斜視図である。

【図５】従来のロータリー充填機を示す斜視図である。

【図６】同ロータリー充填機のコンベア部を拡大して示す斜視図である。

【図７】従来の搬送用据置台を示す斜視図である。

【図８】図７のものとは凹陥部の大きさが異なる搬送用据置台の他の従来例を示す斜視図である。

【図９】図７，８のものとは凹陥部の形状が異なる搬送用据置台の他の従来例を示す斜視図である。

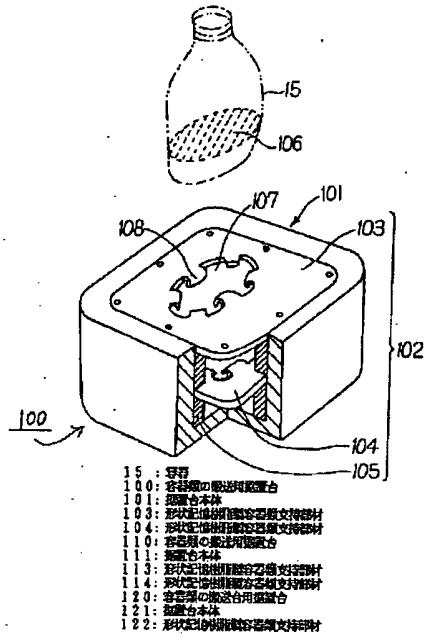
【図１０】図７～９のものとは凹陥部の形状が異なる搬送用据置台の他の従来例を示す斜視図である。

【図１１】本件出願人が既に提案した搬送用据置台を示す斜視図である。

【符号の説明】

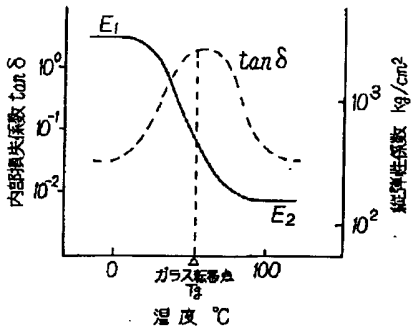
１５　容器
１００　容器類の搬送用据置台
１０１　据置台本体
１０３　形状記憶樹脂製容器類支持部材
１０４　形状記憶樹脂製容器類支持部材
１１０　容器類の搬送用据置台
１１１　据置台本体
１１３　形状記憶樹脂製容器類支持部材
１１４　形状記憶樹脂製容器類支持部材
１２０　容器類の搬送用据置台
１２１　据置台本体
１２２　形状記憶樹脂製容器類支持部材

【図1】

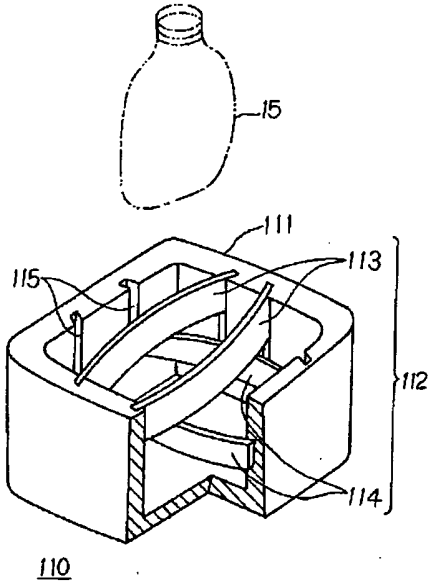


15：容器
100：容器類の搬送用固定台
101：固定台本体
103：形状記憶樹脂製容器支持部材
104：形状記憶樹脂製容器支持部材
110：容器類の搬送用固定台
111：固定台本体
113：形状記憶樹脂製容器支持部材
114：形状記憶樹脂製容器支持部材
120：容器類の搬送台用固定台
121：固定台本体
122：形状記憶樹脂製容器支持部材

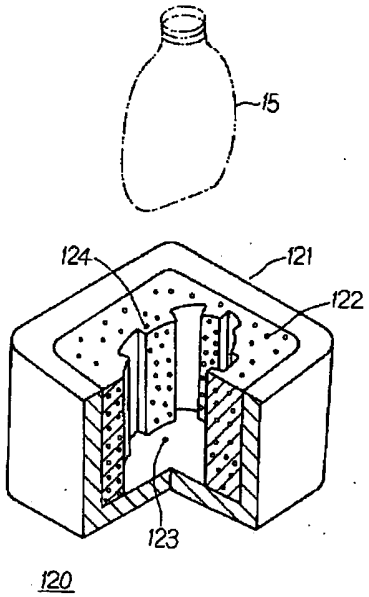
【図2】



【図3】



【図4】



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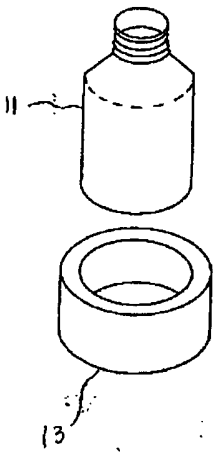

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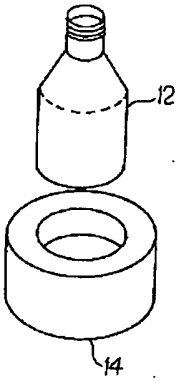

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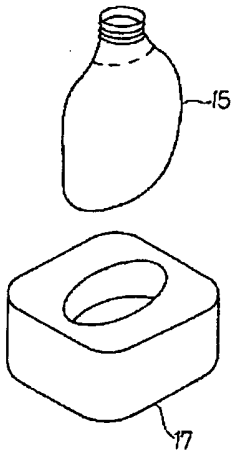

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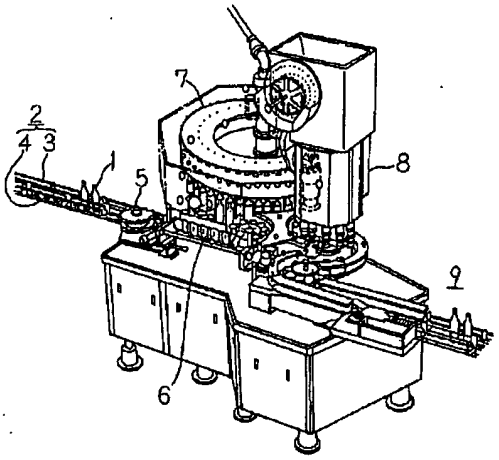

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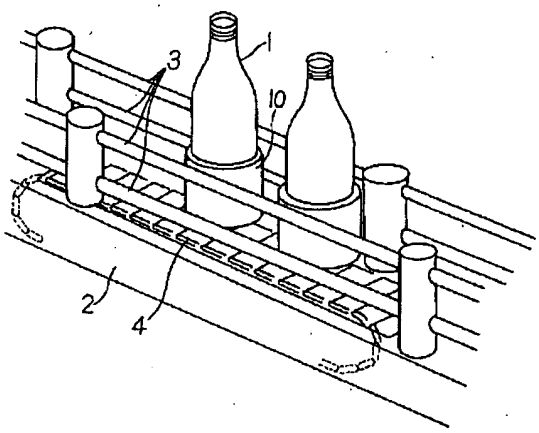

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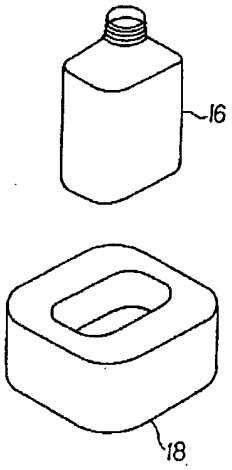

【図11】